What Is Claimed Is:

1. A high performance reflector system for use on scintillator elements contained in a scintillator array of a computed tomograph imaging system, the scintillator elements having a reflective material coupled along its surfaces defined within the gaps between scintillator elements, the reflective material comprising:

a smoothening layer;

a metallic reflective layer applied to said smoothening layer layer; and

a top layer applied to said metallic reflective layer, said top layer providing an environmental barrier to said metallic reflective layer.

2. The reflective material of claim 1, wherein said smoothening layer comprises an etched smoothening layer.

3. The reflective material of claim 1 further comprising an adhesion layer applied between said smoothening layer and said metallic reflective layer.

4. The reflective material of claim 1, wherein said smoothening layer has a thickness of about 0.5 to 10 microns.

5. The reflective material of claim 1, wherein said smoothening layer comprises a low viscosity polymer material, said polymer material being transparent to the emission wavelengths of said plurality of scintillator elements.

6. The reflective material of claim 5, wherein said low viscosity polymer material is selected from the group consisting of silicone hardcoats, styrene acrylate coatings, ultraviolet curable hardcoats, Epotek, Hysol®, and Saran oligomer coatings.

7. The reflective material of claim 3, wherein said adhesion layer has a thickness of less than about 200 Angstroms.

8. The reflective material of claim 3, wherein said adhesion layer is selected from the group consisting of a titanium adhesion layer, an aluminum adhesion layer, a tungsten adhesion layer, a chromium adhesion layer, and a zirconium adhesion layer.

9. The reflective material of claim 1, wherein said metallic reflective layer has a thickness of at least 500 Angstroms.

10. The reflective material of claim 1, wherein said metallic reflective layer has a thickness of between about 2000 and 3000 Angstroms.

11. The reflective material of claim 1, wherein said metallic reflective layer is selected from the group consisting of a silver reflective layer, a gold reflective layer, a copper reflective layer, a rhodium reflective layer, a magnesium reflective layer, and an aluminum reflective layer.

12. The reflective material of claim 1, wherein said top layer comprises a barrier coating layer applied to a thickness of at least 500 Angstroms.

13. The reflective material of claim 1, wherein said top layer comprises a barrier coating layer applied to a thickness of between about 1000 and 5000 Angstroms.

14. The reflective material of claim 1, wherein said top layer comprises a barrier coating layer, said barrier coating layer selected from the group consisting of a metallic barrier coating layer, an inorganic barrier coating layer, and a ceramic barrier coating layer.

15. The reflective material of claim 14, said top layer further comprising a polymeric encapsulant applied to said barrier coating layer.

16. The reflective material of claim 15, wherein said polymeric encapsulant has a thickness of between approximately 5 and 10 micrometers.

17. The reflective material of claim 15, wherein said polymeric encapsulant is selected from the group consisting of a ultraviolet cured hardcoat, a styrene acrylate encapsulant, a Saran oligomer encapsulant, and an amorphous Teflon encapsulant.

18. The reflective material of claim 1, wherein said top layer comprises a polymeric encapsulant having a thickness of between approximately 5 and 10 micrometers.

19. The reflective material of claim 18, wherein said polymeric encapsulant is selected from the group consisting of a ultraviolet cured hardcoat, a styrene acrylate encapsulant, a Saran oligomer encapsulant, and an amorphous Teflon encapsulant.

20. A method for forming a high performance reflector for a scintillator array used in a computed tomograph imaging system, the high performance reflector having a plurality of scintillator elements formed in an array, the method comprising:

applying a smoothening coating to a top surface and to each of four adjacent side surfaces of each of said plurality of scintillator elements;

optionally etching said smoothening layer;

optionally applying an adhesion layer to said smoothening layer;

applying a metallic reflective layer to said adhesion layer; and

applying a top layer to said metallic reflective layer, said top layer providing an environmental barrier to said metallic reflective layer.

21. The method of claim 20, wherein applying a smoothening layer comprises spin coating said surface with a low viscosity polymer material, said low viscosity polymer material being selected from the group consisting of silicone hardcoats, styrene acrylate coatings, ultraviolet curable hardcoats, Epotek, Hysol®, and Saran oligomer coatings.

22. The method of claim 20, wherein optionally etching said smoothening layer comprises optionally argon plasma etching said smoothening layer.

23. The method of claim 20, wherein applying said metallic reflective layer comprises sputtering said metallic reflective layer onto said smoothening layer.

24. The method of claim 20, wherein applying said metallic reflective layer comprises depositing said metallic reflective layer onto said smoothening layer using a chemical vapor deposition technique.

25. The method of claim 20, wherein applying said metallic reflective layer comprises depositing said metallic reflective layer onto said smoothening layer using a physical vapor deposition technique.

26. The method of claim 20, wherein applying said metallic reflective layer comprises depositing said metallic reflective layer onto said smoothening layer using a chemical reduction from a liquid phase technique.

27. A scintillator for use in a computed tomograph application comprising:

a plurality of scintillator elements formed into an array, each of said plurality of scintillator elements having a top surface and four adjacent side surfaces;

a smoothening layer applied to said top surface and to each of said four adjacent side surfaces; and

a metallic reflective coating applied to said smoothening layer, said metallic reflective coating formed from a reducing agent and a metal complex.

28. The scintillator of claim 27, wherein said metal complex comprises a silver amine complex.

29. The scintillator of claim 27, wherein said metal complex is selected from the group consisting of a gold cyanide complex and a gold thiosulfate complex.

30. The scintillator of claim 27, wherein said metal complex comprises a rhodium metal complex.

31. The scintillator of claim 27, wherein said reducing agent comprises an aqueous solution of glucose.

32. The scintillator of claim 27, wherein said reducing agent comprises an aqueous solution of a Rochelle salt.

33. The scintillator of claim 27, wherein said metal complex comprises a copper amine complex.

34. A method for forming a high performance reflector for a scintillator array used in a computed tomograph imaging system, the scintillator array having a plurality of scintillator elements, the method comprising:

applying a smoothening coating to a top surface and to each of four adjacent side surfaces of each of said plurality of scintillator elements;

applying a reducing agent to said smoothening coating;

degassing said reducing agent;

applying a metal complex solution to said reducing agent layer to form a metal reflecting layer; and

washing and drying said metal reflecting layer.

35. The method of claim 34, wherein said reducing agent comprises an aqueous solution of glucose.

36. The method of claim 34, wherein said reducing agent comprises an aqueous solution of a Rochelle salt.

37. The method of claim 34, wherein said reducing agent solution and said metal complex solution are mixed to form a mixture prior

to applying said reducing agent and said metal complex solution to said adjacent surfaces within said gap.